UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/776,472 | 02/11/2004 | Daniel James Branagan | NANO004U | 4067 |

32047 7590 03/07/2006

GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC
55 SOUTH COMMERICAL STREET
MANCHESTER, NH 03101

| EXAMINER | |
|---|---|
| ZHENG, LOIS L | |
| **ART UNIT** | **PAPER NUMBER** |
| 1742 | |

DATE MAILED: 03/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/776,472 | BRANAGAN, DANIEL JAMES | |
| | Examiner | Art Unit | |
| | Lois Zheng | 1742 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *14 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *6,7 and 9-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6-7 and 9-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 14 December 2005 has been entered.

### *Status of Claims*

2. Claims 6 and 11 are amended in view of the amendment filed 14 December 2005. Claim 8 is canceled in view of the amendment. Therefore, claims 6-7 and 9-12 are currently under examination.

### *Claim Interpretation*

3. Regarding claims 6 and 11, since no specific order is required for executing processing steps (a) – (d), the examiner is interpreting that the sequence of the claimed processing steps can take place in any order. In addition, since processing steps (a)-(d) recite the same iron based metallic coating alloy and the metal surface is relatively clean(i.e. the cleaned surface may still contain oxides) with the application of the iron based metallic coating alloy, the examiner is interpreting that the processing steps (c) and (d) may take place simultaneously(i.e. steps(c) and (d) are the same coating application step) based on the broadest reasonable interpretation.

### *Claim Rejections - 35 USC § 112*

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 6-7 and 9-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Independent claims 6 and 11 recite that the deoxidizing metal is present between 20%-70% in the iron based metallic coating alloy. There is no literal support in the specification for this limitation. Claims 7, 9-10 and 12 are also rejected since they depend on independent claims 6 and 11.

### *Claim Rejections - 35 USC § 103*

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 6-7 and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Branagan et al. US 6,258,185(Branagan).

Branagan discloses a method of forming a steel(abstract). Branagan teaches, in one of the embodiments, that metallic iron based alloy of $Fe_{64}Ti_3Cr_5Mo_2B_{16}C_5Si_1Al_2Gd_2$

(Table 1) is plasma sprayed onto the surface of a steel drum to form a coating layer(col. 6 lines 15-18). Branagan further teaches, in one of the embodiments, that a metallic molten alloy of $Fe_{68}Cr_4Mo_7P_{12}B_6C_3$ is sprayed onto a metallic substrate to form a coating layer(col. 7 lines 15-18).

Regarding claims 6 and 11, the process of Branagan teaches the same application of the molten iron based metallic alloy as the claimed process.

Even though the deoxidizing metal as taught by Branagan (i.e. Ti, Cr, Gd) does not explicitly meets the claimed 20%-70% range, one of ordinary skill in the art would have found it obvious to have routinely varied and optimized the amount of deoxidizing metals in the iron alloy of Branagan in order to produce a protective coating with various desired properties.

In addition, since Branagan teaches that application of the claimed iron based metallic coating alloy, the claimed removing of oxidized metal surface to provide a relatively clean metal surface is inherently taking place in the coating application process of Branagan.

Furthermore, the claimed ASTM C633 bond strength of at least about 5500psi is an inherent property of the metallic coating. Therefore, since Branagan teaches a coating process that is the same as the instantly claimed coating process using an iron based metallic coating alloy that is substantially similar to that of the instant claim, one of ordinary skill in the art would have found that the ASTM C633 bond strength in the metallic coating strength to be at least about 5500psi as well.

Regarding claim 7, since Branagan do not teach the presence of precipitates in the molten coating alloy, the examiner construes that the precipitates is not present in the molten coating alloy of Branagan based on the broadest interpretation.

Regarding claim 9-10, the plasma spraying technique of Branagan reads on the claimed thermal spraying technique.

With respect to claim 12 of the instant invention, the B, C, P and Si in the iron based alloys of Branagan read on the claimed oxygen seeking nonmetal/metalloid as claimed.

8. Claims 6-7 and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kammer et al. US 4,348,433(Kammer).

Kammer teaches flame-spray coating metal substrate with a iron based alloy material forming a coating with bond strength of about 2500psi and above(col. 1 lines 14-21, col. 2 lines 41-52, col. 4 lines 32-40, col. 7 lines 18-23).

Regarding claims 6 and 11, Kammer also teaches the claimed deoxidizing element such as 5-35% of Cr and the claimed oxygen seeking nonmetal/metalloid such as 0-5% Si, 0-5% B and 0-5% C(col. 4 lines 57-65). The amount of deoxidizing element overlaps the claimed deoxidizing element of 20%-70%. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05. The selection of claimed deoxidzing elment range from the disclosed range of Kammer would have been obvious to one skilled in the art since Kammer teaches the same utilities in its' disclosed deoxidizing element range. The claimed melting of iron based coating alloy is inherently present in the

coating process of Kammer since flame spaying technique uses liquid melt of the coating alloy.

In addition, since Kammer teaches that application of the claimed iron based metallic coating alloy, the claimed removing of oxidized metal surface to provide a relatively clean metal surface is inherently taking place in the coating application process of Kammer.

Furthermore, the bond strength as taught by Kammer(i.e. about 2500psi and above) encompasses the claimed bond strength of at least about 5500psi. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05. The selection of claimed bond strength range from the disclosed range of Kammer would have been obvious to one skilled in the art since Kammer teaches the same utilities in its' disclosed bond strength range.

Regarding claim 7, since Kammer does not teach the presence of precipitates in the molten coating alloy, the examiner construes that the precipitates is not present in the molten coating alloy based on the broadest interpretation.

Regarding claim 9-10, the flame spraying technique as taught by Kammer reads on the claimed thermal spraying technique.

Regarding claim 12, the B, C and Si in the iron based alloys of Kammer read on the claimed oxygen seeking nonmetal/metalloid as claimed.

***Response to Arguments***

9. Applicant's arguments filed 14 December 2005 have been fully considered but they are partially moot in view of the new grounds of rejection.

In the remarks, applicant argues that none of Branagan and Kammer references teach applying the liquid melt of the iron based metallic coating alloy to the metal surface wherein the metal surface contains an oxidized surface layer and reducing the oxidized surface layer with said iron based metallic coating alloy liquid melt.

The examiner does not find applicant's argument persuasive since the instant process steps (c) and (d) as recited in claim 6 and instant process steps (c)-(d) and (e) as recited in instant claim 11 can take place simultaneously based on the broadest reasonable interpretation. Therefore, the claimed reduction of oxidized surface layer with the iron based metallic coating alloy melt inherently takes place in the coating processes of Branagan and Kammer since the coating compositions of Branagan and Kammer are substantially similar to that of the instant invention.

Applicant further argues that Kammer teaches the application of metallic coating to an already cleaned metal surface.

Applying a metallic coating to an already cleaned metal surface is not the same as applying a metallic coating to a metal surface that is relatively clean of oxides. Therefore, the coating process of Kammer still inherently teaches the reduction of oxidized surface as claimed since Kammer's coating composition is substantially similar to that of the instant invention.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LLZ

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700